APPENDIX-VI

MAHARSHI DAYANAND SARASWATI UNIVERSITY AJMER

Certificate by Supervisor

Certified that:

1. I am willing to guide the research work of Mrs. Sangeeta rathore on the above subject if she is registered for Ph.D.

2. To the best of my knowledge, the subject selected has not studied and is not being studied so far in any university.

3. The subject is of sufficient scope to keep the candidate engaged for two year.

4. The subject will lead to a valuable contribution. I have seen and approved the outline of Proposed research work submitted by the candidate.

5. I have 4 research candidates registered under my supervision and the serial number of this candidate whose application is being forwarded for registration is 4(give the serial number).

6. The candidate is not in a close relation (the term of close relation is defined in the examination ordinance of the University).

Signature of the Supervisor with date

Certified that the available facilities will be extended to Mrs. Sangeeta Rathore for research work if she is registered for Ph.D.

Signature of the Principal with date

Signature of the Head of the Dept. with date

Annexure-(a)

INTRODUCTION

Heterocyclic compound is one which possesses cyclic structure with at least one different kind of hetero atom in the ring. Nitrogen, oxygen and sulphur are the most common hetero atoms. Heterocyclic compounds are widely distributed in nature and are essential to life in various ways.

The substituted-2-aminobenzothiazole is sulphur and nitrogen containing bicyclic ring system fused with phenyl ring. Substituted -2- amino benzothiazoles scaffold comprises a bicyclic ring system and is known to exhibit a wide range of biological properties including antimicrobial and anticancer activities encouraged to synthesize some new derivatives of benzothiazole.

The study of substituted-2-aminobenzthaizole derivatives is of considerable current interest due to their important biological and biophysical properties. Medical chemistry plays an important role in development of drugs for maintaining and improving health of human beings. It is also equally important to design chemical entities for prevention of the growth of micro organisms which come in contact with human beings in everyday life.

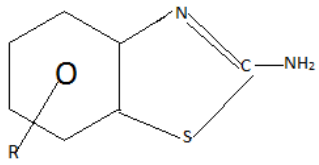
Annexure-I(b)

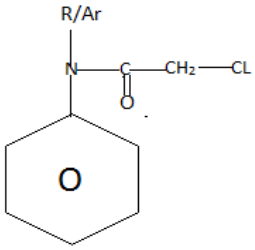
Importance of proposed investigation

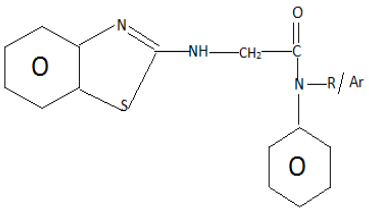
The chemistry and biological study of hetrocyclic compound has been an interesting field for a long time in medicinal chemistry. Substituted-2-amino benzothiazole(I) derivatives are an important class of compound which is becoming increasingly important due to their board spectrum of biological activities. Substituted benzothiazole derivatives are known for pharmacological activities such as antitumor, antiviral, anthelmintic, analgesics, anti-inflammatory and anticytotoxic etc.

Similarly halogenated acid and acid derivatives that eliminate and inhibit the development of bacteria, fungi, parasities or virus are called antimicrobial and respectively referred to as antibacterial, antifungal ant parasitic and antiviral agents. The coupling of the substituted-2-aminobenzothiazole and anilides of secondary aromatic or aliphatic amine derivatives in one compound (III) may impart enhanced biological activities to the resulting compounds.

The survey of literature shows that benzothiazole nucleus and secondary amines show wide spectrum of biological activities. So combining these nuclei may enhance the biological activities of resulting compounds.







Annexure-I(c)

Objectives

The main objective of the proposed research work are as follows-

1. Synthesis of substituted-2-aminobenzothaizole by cyclization of thiobenzamides .
2. Synthesis of α- chloro anilides of secondary aromatic or aliphatic amines.
3. Synthesis of substituted-2-aminobenzothaizole derivatives having α-chloro anilides of secondary aromatic or aliphatic amines.
4. The above synthesized, compound will be characterized by their spectral studies (NMR, IR etc).
5. The new heterocyclic compounds will be tested for their biological activities (antimicrobial, anticancer etc).

Review of work already done on the subject of proposed research study

The survey of literature regarding benzothiazole and their derivatives are very important for numerous pharmacological activities like antitumor, anticonvulsant, antimicrobial, ant-helmintic, antileishmanial, antitubercular, schictosomicidal, antifungal, ant-inflammatory, antipsychotic, antidiabetic, antiallergic activities. Our Proposed work is focused to the substituted-2-aminobenzothiazole nucleus. In fact benzothiazole derivatives possess a wide spectrum of biological applications such as antihistaminic, antiparasitic, antiviral, antibacterial. Substituted benzothiazole nucleus containing molecules are also reported as antiallergic, antidiabetic and anti HIV agents. A large number of substituted benzothiazole derivatives are used as potential drug in treatment of various disease such as chemotherapeutic ,analgesic, antibiotic, antiulcer etc .

Similarly literature reveals that some polyfunctional amine are worked as valuable antihistamine. Halogenated acid and acid derivatives have been used in the field of medicinal chemistry. These compound inhibit the development of bacteria, fungi, parasities and virus are called antimicrobials . Benzothiazole is a versatile nucleus in the field of pharmaceutical chemistry hence this unique molecule must serve in developing future therapeutic agents.

We believe that this review gives a better understanding and scope for future drug design and development of substituted-2-aminobenzothiazole and anilides of secondary aromatic or aliphatic amines in the same compound to implicate their use in wide range of applications .

Research gap identified in the proposed field of investigation

The survey of literature regarding substituted-2-aminobenzothiazole and their derivatives are very important in the field of medicinal chemistry.

The study demonstrates various methods to synthesise them along with their biological and biophysical activities. Such derivatives containing substituted benzothiazole nucleus coupled with secondary aromatic/ aliphatic anilides moiety are unfamiliar So, keeping in mind their therapeutic and pharmaceutical importance, a plan to synthesise some novel substituted-2-aminobenzothiazole derivatives possessing anilides of secondary amines has been made. Therefore compounds with enhanced and better biological properties can be obtained. Hoping for better and improved results compared to input units some biological activities will be carried out.

Major hypothesis

The survey of literature confirms that substituted-2-aminobenzothiazole derivatives displays significant role for various therapeutic and biological activities.

It exhibits ant-inflammatory, antitumor, antimicrobial, anthelmintic and anticancer activities.

Substituted-2-aminobenzothiazole coupled with α-chloro anilides of secondary aromatic or aliphatic amine will form a new derivatives. The study of such derivatives will be of considerable current interest due to their biological and biophysical properties. Hope they will prove substantial for human life.

Research methodology

The present research plan comprises of following steps.-

1. Synthesis of substituted-2-aminobenzothiazole derivatives:- These will be prepared by cyclisation of thiobenzamides using sodium hydride in N-methyl pyrrolidinone (NMP) as a cyclizing agent at 140°C .
2. Synthesis of anilides of secondary aromatic / aliphatic amines:- These derivatives will be synthesized by the reaction of aromatic/ aliphatic amines with chloro acetic acid in the presence of glacial acetic acid and sodium acetate.
3. Synthesis of benzothiazole derivatives containing anilides:- These will be synthesized by the reaction of substituted-2-aminobenzothiazolel with α-chloro anilides of secondary aromatic or aliphatic amines , in DMF.
4. Thin layer chromatography of synthesized compound will be performed after purification and recrystallization.
5. Structural elucidation:-
   (a) NMR spectra of synthesized compound will be recorded and chemical shift to various peaks will be determined.
   (b) IR spectra will be recorded and the absorption band will be assigned to vibration of different bands.
6. Biological activities:- Biological study for potential biological activities (antibacterial antifungal etc.) will be evaluated by using standard method that is paper disc method and radial growth method for antibacterial and antifungal activities respectively, results will be compared with standard drugs.

Annexure - VI

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SYNOPSIS

TITLE OF PROPOSED RESEARCH WORK

SYNTHESIS AND BIOLOGICAL ACTIVITY OF SUBSITUTED-2-AMINO BENZOTHIAZOLE CONTAINING ANILIDES MOIETY OF SECONDARY AMINES

f}rh;d ,sehuks ds ,sfuykbM v/kkZa’k ;qDr izfrLFkkfir 2&,sehuks csatksFkk;ktksy dk la’ys"k.k ,oa tSfod lfdz;rk

SUBMITTED TO

MAHARSHI DAYANAND SARASWATI UNIVERSITY, AJMER

FOR Ph.D. IN CHEMISTRY

Name of Scholar

Sangeeta Rathore

Dept. of Chemistry

SPC Govt. College, Ajmer

Name of Supervisor

Dr. Arun Pareek

Lecturer (selection scale)

Dept. of Chemistry

SPC Govt. College, Ajmer

Certificate

This is to certify that Mrs . Sangeeta Rathore Son/Daughter of Mr. Dr.Durjan Sal Singh has qualified the Course Work of Paper- II & III for Regisration for the Ph.D programme in the Department of Chemistry of the S. P.C. Govt. College, Ajmer (name of the College/University) on……(date/month/year).

Signature with date

Head of the Department

APPENDIX - IV-B

महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर

शोध पंजीयन हेतु आवेदन पत्र

(Reference Ord. 124.11)

विभागाध्यक्ष,
.....

प्राचार्य,
.....

म.द.स. विश्वविद्यालय,
अजमेर।

.....

Photo

विषयः– शोध पंजीयन हेतु आवेदन।

महोदय/महोदया,

विषयान्तर्गत निवेदन है कि विश्वविद्यालय के परिपत्र क्रमांकः एफ–15/शोध/मदसविवि/ ..... दिनांक ..... में वर्णित सूचना के अनुसार मैनें निर्धारित कोर्स वर्क सफलतापूर्वक पूर्ण कर लिया है और इस परिपत्र के बिन्दु संख्या–1 में दिये गये निर्देशों के अनुसार शोध पंजीयन हेतु यह आवेदन निम्नांकित यांछनीयता पूरी करते हुए प्रस्तुत कर रहा हूं/रही हूं :–

1. मुझे आवंटित शोध पर्यवेक्षक डॉ. .....हैं उन्होंने यह आवेदन पत्र मय दस्तावेज अग्रेषित कर दिया है।
2. आवेदन शुल्क राशि रू.500/– का डी.डी. नं. ..... दिनांक ..... (कुलसचिव, महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर के नाम)
3. अध्यादेश 124.10 में निर्धारित परिशिष्ठ–IV के अनुसार **Format for outline of Proposed Research Work** (6 प्रतियों) में वांछित शोध पर्यवेक्षक के प्रमाण पत्र, (परिशिष्ठ– VI) के साथ संलग्न है।

आपसे अनुरोध है कि कृपया इस आवेदन पत्र को संलग्न दस्तावेजों के साथ निदेशक शोध, म.द.स. विश्वविद्यालय, अजमेर को शोध पंजीयन की कार्यवाही हेतु अग्रेषित करावें।

मुझे ज्ञात है कि शोध पंजीयन से शोधोपाधि प्राप्त होने की अवधि में मैं अन्य कोई उपाधि पाठ्यक्रम में प्रवेश नहीं ले सकता/सकती। यदि इस विश्वविद्यालय या किसी अन्य विश्वविद्यालय से कोई डिप्लोमा या सर्टिफिकेट (नियमित/पार्ट टाईम/दूरस्थ शिक्षा) इस अवधि में करना चाहूंगा/चाहूंगी तो यह मैं तब ही करूंगा/करूंगी जब मुझे मेरे शोध पर्यवेक्षक यह प्रमाण पत्र दे देंगे कि इस पाठ्यक्रम को करने से शोध कार्य बाधित नहीं होगा।

संलग्न– उपर्युक्त

प्रार्थी,

दिनांक.....

हस्ताक्षर.....
पूरा नाम एवं पता .....
.....
.....
टेलीफोन/मोबाईल नं0 .....

आवंटित सेवारत शोध पर्यवेक्षक की अग्रेषण टिप्पणी

मैं, डॉ0 ..... इस विश्वविद्यालय का पंजीकृत शोध पर्यवेक्षक हूं। वर्तमान में .....
..... में कार्यरत हूं। मेरी सेवानिवृत्ति की दिनांक ..... है।

शोध पंजीयन हेतु उक्त आवेदन पत्र मय संलग्न दस्तावेज निदेशक, शोध, म.द.स. विश्वविद्यालय को कृपया अग्रेषित कराएं।

दिनांक :

हस्ताक्षर .....
नाम .....
टेलीफोन/मोबाईल नं0 .....

आवंटित सेवानिवृत्त शोध पर्यवेक्षक की अग्रेषण टिप्पणी

मैं, डॉ0 ..... इस विश्वविद्यालय का पंजीकृत शोध पर्यवेक्षक हूं। मैं दिनांक .... को ..... से सेवानिवृत हो चुका हूं। उक्त अभ्यर्थी को .....विभाग/ महाविद्यालय में शोध करने की अनुमति प्राप्त कर ली है, जो संलग्न है। शोध पंजीयन हेतु उक्त आवेदन पत्र मय संलग्न दस्तावेज निदेशक, शोध, म.द.स. विश्वविद्यालय को कृपया अग्रेषित कराएं।

दिनांक :

हस्ताक्षर .....
नाम .....
टेलीफोन/मोबाईल नं0 .....

क्रमांक: दिनांक:

निदेशक (शोध)
म.द.स. विश्वविद्यालय, बाजमेर– 305009

शोधार्थी ..... का शोध पंजीयन हेतु, आवंटित शोध पर्यवेक्षक से अनुशंषित आवेदन पत्र मय संलग्न उपर्युक्त दस्तावेजों के साथ शोध पंजीयन हेतु अग्रेषित है।

हस्ताक्षर एवं सील, प्राचार्य/ विभागाध्यक्ष

शोध अनुभाग के उपयोग हेतु

आवेदन पत्र की जांच कर ली गई है। अतः संबंधित शोध पंजीयन समिति की बैठक में निर्णयार्थ रखे जाने योग्य है

हस्ताक्षर जांच कर्ता

अथवा

आवेदन पत्र की जांच की गई और निम्न कमियां पाई गई जिनकी पूर्ति करायी जानी है :–

1.

2.

3.

आवेदन पत्र में पाई गयी उक्त कमियां अभ्यर्थी द्वारा दिनांक ..... को पूरी कर दी गयी है। अतः संबंधित विषय शोध समिति की बैठक में निर्णयार्थ रखे जाने योग्य है।

हस्ताक्षर जांच कर्ता

APPENDIX- IV-A

MAHARSHI DAYANAND SARASWATI UNIVERSITY, AJMER

Formate for Outline (Synopsis) of Proposed Research Work

(Reference Ord.124.11)

1. Name of Scholar (In English) :- Sangeeta Rathore

   (In Hindi) :- संगीता राठौड़

2. Title of the Research Work :-

   (In English) :- Synthesis and biological activity of substituted-2- aminobenzothiozole containing anilides moiety of secondry mines

   (In Hindi) :- द्वितीयक ऐehनो के ,sनिलाइड अर्धांश युक्त प्रतिस्थापित 2- ऐमhनो बेंजोथायkजोल का सं'ys"k.k एoa जैविक सक्रियता

Location:

   a. Institution /Department where The work is to be done :- Dept. of chemistry SPC Govt. College, Ajmer
   b. Geographical area of Investigation , if any :- NO

3. Introduction, Importance of Proposed Investigation, Objective :- Annexure-I (a)(b)(c)

4. Review (Work already done on the subject of proposed Research Study :- Annexure-II

6.Research Gaps identified in the proposed field of investigation. (Based on the review) :- Annexure-III

7.Major Hypothesis, if any :- Annexure IV

8. Research Methodology :- Annexure –V

9. List of references cited :- Annexure –VI

Signature of the Candidate with date

Outline Approve

Name and Signature of supervisor with date & seal.